



**SOIL WATER AIR PROTECTION ENTERPRISE**  
2656 29th Street, Suite 201  
Santa Monica, California 90405  
Attn: Rob Hesse, P.G.  
Tel: (310) 434-0110  
Fax: (310) 434-0011

February 24, 2016

Maya Golden-Krasner, Esq.  
Center for Biological Diversity  
1212 Broadway, Suite 800  
Oakland, CA 94612

Subject: Location of Existing and Future Water Supply Wells in Areas Surrounding the  
Arroyo Grande Oilfield, San Luis Obispo County, California

Dear Ms. Golden-Krasner:

This letter presents information regarding the location of existing and future water supply wells in areas surrounding the Arroyo Grande Oilfield. The information presented herein is intended as a supplement to my previous work in support of comments on the Arroyo Grande Aquifer Exemption Application submitted by Matt Hagemann in his letter dated December 14, 2015.<sup>1</sup> My work is specifically focused on the accurate location of water supply wells in relation to the Oilfield and the Proposed Aquifer Exemption Boundary.

I am a Professional Geologist in California and have over twenty years of experience as a consulting environmental scientist. I have specific and extensive experience using geographic information systems and other mapping applications to integrate and evaluate geographical data from various sources.

## **WATER SUPPLY WELL LOCATIONS**

Accurate information on water supply wells is critical due to the proximal nature of many wells to the Proposed Aquifer Exemption Boundary; however, information included in the Application is incomplete and inexact as to the completions of wells and locations.<sup>2</sup> Permit records may be missing for some wells. For permit records that do exist, information regarding the locations of wells can be limited to crude sketch maps. Therefore, a comprehensive survey of wells in the Study Area requires additional methods of identification and verification in the field.

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<sup>1</sup> Letter to Maya Golden-Krasner, Re: Comments on the Arroyo Grande Aquifer Exemption Application. Matt Hagemann, P.G., C.Hg. December 14, 2015.

<sup>2</sup> *Ibid*, Pg. 2. Note that well completion records were located for half of the 105 wells identified in the Application.

The identification of well locations can be aided through the use of aerial photography. To illustrate this point, I have mapped the locations of water storage tanks in the Study Area using 2013 aerial photography and mapping tools in Google Earth. Water storage tanks are often used by well owners to contain a ready supply of water for service. These tanks are typically situated nearby wells. I previously submitted annotated map images demonstrating this exercise.

The mapping of probable well locations using aerial photography is also limited. For example, wells and/or water storage tanks may be obscured by trees. Furthermore, wells completed after the date of the aerial photographic coverage (August 2013 in Google Earth), will not be evident. **Attachment A** presents well permit and location information for one such well completed immediately near the north edge of the Proposed Aquifer Exemption Boundary. This particular well is not visible in Google Earth's 2013 coverage. Field verification is therefore necessary.

It could be postulated that a well is likely present near any inhabited structure in most areas. This includes larger ranch style residential properties and smaller parcels in residential tracts, where wells may be used for potable water and/or irrigation. One or more wells may exist on larger properties and in agricultural fields. Some of the existing wells in the Study Area may or may not have permit records. For those that do not, some of the existing wells may not be identified using aerial photography. Thus, field verification of wells at all developed parcels would provide confirmation of the presence or absence of a well at all properties in the area.

## **LOCATIONS OF WELLS RELATIVE TO EXCLUSION BOUNDARY**

The Proposed Aquifer Exemption Boundary is based on hydraulic isolation barriers supported by data that is highly interpretive.<sup>3</sup> Some wells, for which there is limited information, may exist adjacent to or within the Proposed Aquifer Exemption Boundary. **Attachment B** presents a map illustrating the locations of water storage tanks (probable well locations) based on 2013 aerial photography along with the approximate boundary of control barriers (pinchout, fault, facies change, or tar seal) in the Application. One or more probable well locations are situated proximal to or within these boundaries (see **Attachment B**). I have updated a cross-section that illustrates the position of a probable well location within the tar seal boundary delineated in the Application (**Attachment C**). Based on information indicating that a well at this property is approximately 105 feet deep, this well may not be hydraulically isolated from the Oilfield.

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<sup>3</sup> *Ibid*, Pg. 3.

In the future, wells may be desired by land owners in areas that have not been considered in the Application. For example, the well location indicated in **Attachment A** was completed in September 2015 at a location immediately adjacent to the Proposed Aquifer Exemption Boundary. The Application included a well survey conducted prior to June 2015; however, this particular well was probably not included in the inventory of wells that were surveyed. By this example, it should be anticipated that additional future wells may be completed in near proximity to the Proposed Aquifer Exemption Boundary.

### **CLOSING**

Due to limitations associated with available well permit records, aerial photographic coverage, and other indirect information sources, a comprehensive and accurate inventory of existing water supply wells and locations should include thorough field reconnaissance, inspections, and interviews with well owners to verify locations and obtain well completion information.


Very truly yours,

A handwritten signature in black ink, appearing to read "Rob C. Hesse", written in a cursive style.

Rob C. Hesse, P.G.

# **Attachment A**

# Attachment A - Permit No. 2015-123 - Well Permit Application and Coordinates



**COUNTY OF SAN LUIS OBISPO**  
PUBLIC HEALTH DEPARTMENT  
Environmental Health Services  
2156 Sierra Way • P.O. Box 1489  
San Luis Obispo, CA 93486-1489  
Phone: (805) 781-5544 FAX: (805) 781-4211

OFFICE USE  
Permit No. 2015-123  
Submittal Complete  
Date 10/2/15  
By: ms  
WP1013279  
SR No. 109754

**WELL PERMIT APPLICATION**

Name of Well Owner Richard A Woodall Phone No. 661 204 0075  
Name of Property Owner Kerry Meermann Phone No. 805 689 3242  
Mailing Address of Property Owner PO Box 9513 Bakersfield CA 93389  
Name of Drilling Contractor Doug Enloe C-57 License No. CA 31887  
Drilling Company Name Enloe Well Drilling  
Business Address PO Box 1698 Nipomb CA 93444 Phone No. 805 343 1698

Proposed Well Site Address Carpenter Canyon Rd City or Area of County Edna  
Assessor's Parcel No. 044211-002 ownership Range Section  
Parcel Size (acres) 3.2 In Coastal Zone? NO GPS Coordinates 35 11 469 N 120 36 285 W  
Is the parcel served water by a public water agency? Yes ☐ No ☒ Is the proposed well located within city limits? Yes ☐ No ☒

Well Type	Purpose of Well	Drilling Method
<input type="checkbox"/> Construction	<input checked="" type="checkbox"/> Domestic Private	<input type="checkbox"/> Rotary
<input type="checkbox"/> Repair/Modify	<input type="checkbox"/> Domestic Public	<input checked="" type="checkbox"/> Reverse Rotary
	<input type="checkbox"/> Irrigation	<input checked="" type="checkbox"/> Cable Tool
	<input type="checkbox"/> Livestock Water	<input type="checkbox"/> Air Rotary

Proposed Depth 150 Casing Diameter 5" Annular Seal Depth 50

Do you anticipate drilling into a water bearing formation that has the potential to degrade a higher quality aquifer? Yes ☐ No ☒  
If yes, please explain \_\_\_\_\_

Is there any known potential to encounter a water bearing formation where levels of water quality constituents such as nitrate, selenium, hydrogen sulfide, boron, organics, etc., are a concern? Yes ☐ No ☒ If yes, please explain \_\_\_\_\_

I hereby agree to comply with all applicable laws and regulations of the County of San Luis Obispo and the State of California pertaining to well construction, destruction, repair or modification. Within sixty days after completion of the well, I will furnish Environmental Health Services with a completed well log. This application becomes a valid permit following sign off by Environmental Health Services.  
Only the above named C-57 Licensed driller may sign this permit application.

Signed Doug Enloe Date 6/1/2015  
Print Drilling Contractor Name Doug Enloe

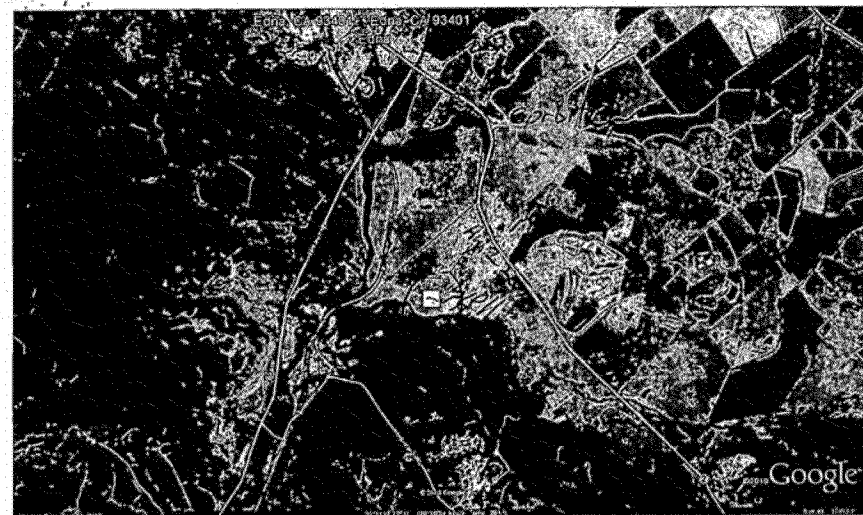
Note: The "Well Permit Plot Plan" shall be attached to this application and indicate within a two hundred foot radius around the proposed well the following items: A) Property lines, B) Sewage disposal and/or sewer lines, C) Animal enclosures and/or any other concentrated sources of pollution, D) All intermittent or perennial, natural or artificial water bodies or water courses, E) Surface water drainage pattern of the site, F) Existing wells, G) Access roads. The proposed site shall be designated with a flagged surveyor's stake labeled "Well Site." (See second page) Drilling shall not commence until this application is approved.

**OFFICE USE ONLY**

Received By ms Date 10-2-15 Fee Paid \$ 695- Check # 2179  
Well Site Approved, Yes ☒ No ☐ By Ke Rhigalia Date 10-4-15  
Site Letter 10/4/15 Comm Letter Exp 12/1/15 Final Letter Sent? Yes ☐ No ☐  
Well Site Approval GPS Coordinates 35.18604 N 120.60803 W  
Special Requirements and/or Comments for Drilling Contractor Inspector for seal - take a truck to well site. Don't need AXA, but truck would be good.  
Water Quality Testing Conducted? Yes ☐ No ☐ Constituents Tested for \_\_\_\_\_  
Well Seal Witnessed? Yes ☒ No ☐ By K. Hewitt Date 09-15-15 Seal Depth 20'  
Well Seal GPS Coordinates 35.18603 N-120-60803 W

**PERMIT IS VALID FOR SIX MONTHS FROM ISSUANCE**

Page 1 of 2



Directions:  
227 South .33 miles past Corbit Canyon  
Go Right at locked gate. Gate combination  
is 1821. Drive .5 miles keeping to left.  
Go Left and follow dirt road for about 1700 feet  
See Metal Stake with can on top as well site

GPS 35 11 969  
120 36 28.51

# Attachment A - Permit No. 2015-123 - Well Completion Report and Location In Near Proximity to the North Edge of the Proposed Aquifer Exemption Boundary

OK - OK - Domestic bpc 10-26-15

The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California  
**Well Completion Report**  
Refer to Instruction Pamphlet No. 00286577

Page \_\_\_\_\_ of \_\_\_\_\_  
Owner's Well Number \_\_\_\_\_  
Date Work Began 08/30/2015 Date Work Ended 9/18/2015  
Local Permit Agency San Luis Obispo Environmental Health  
Permit Number 2015-123 Permit Date 8/4/15

DWR Use Only - Do Not Fill In  
State Well Number \_\_\_\_\_  
Latitude \_\_\_\_\_ Longitude \_\_\_\_\_  
APN/TRS/Other \_\_\_\_\_

**Geologic Log**  
Orientation ☒ Vertical ☐ Horizontal ☐ Angle Specify \_\_\_\_\_  
Drilling Method Cable Tool \_\_\_\_\_ Drilling Fluid Bentonite Mud \_\_\_\_\_  
Depth from Surface \_\_\_\_\_ Feet to \_\_\_\_\_ Feet Describe material, grain size, color, etc.  
0 10 Dark Grey Sandy Clay  
10 20 Dark Grey Clay  
20 30 Dark Grey Fine Sand  
30 40 Dark Grey Sand  
40 50 Dark Grey Sand with 1/8" Gravel  
50 60 Dark Grey Fine Sand  
60 80 Dark Grey Clay  
80 100 Dark Brown Clay and Fine Sand  
100 110 Dark Grey Clay  
110 130 Dark Grey Clay  
130 150 Dark Grey Clay with Fine Sand

**Well Owner**  
Name \_\_\_\_\_  
Mailing Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**Well Location**  
Address No Physical Address/Dirt Road Through some Easement  
City San Luis Obispo County San Luis Obispo  
Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_  
APN Book 044 Page 211 Parcel 002  
Township 31S Range 13E Section \_\_\_\_\_

**Location Sketch**  
(Sketch must be drawn by hand after form is printed.)  
North  
West East  
Dirt Rd  
Well #8

**Activity**  
☒ New Well  
☐ Modifications/Repair  
☐ Deepen  
☐ Other  
☐ Destroy  
Describe procedure and materials under "Notes/Remarks" section.

**Planned Uses**  
☒ Water Supply  
☒ Domestic ☐ Public  
☐ Irrigation ☐ Industrial  
☐ Cathodic Protection  
☐ Dewatering  
☐ Heat Exchange  
☐ Injection  
☐ Monitoring  
☐ Remediation  
☐ Sparging  
☐ Test Well  
☐ Vapor Extraction  
☐ Other

**Water Level and Yield of Completed Well**  
Depth to first water 20 (Feet below surface)  
Depth to Static \_\_\_\_\_  
Water Level 10 (Feet) Date Measured 09/18/2015  
Estimated Yield 8 (GPM) Test Type Constant Rate  
Test Length 12.0 (Hours) Total Drawdown 120 (Feet)  
\*May not be representative of a well's long term yield.

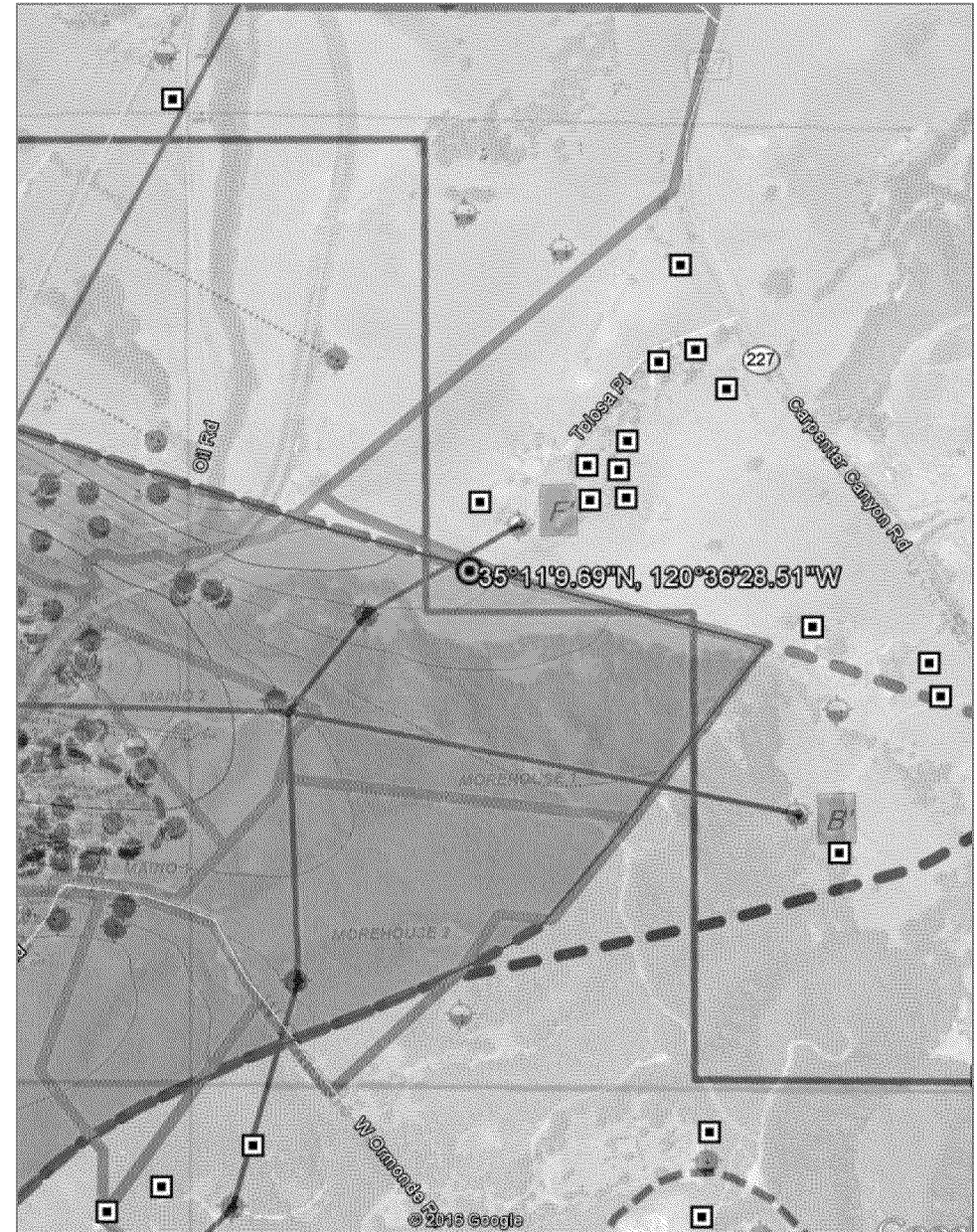
**Casings**  
Depth from Surface \_\_\_\_\_ Feet to \_\_\_\_\_ Feet  
Borehole Diameter \_\_\_\_\_ Type \_\_\_\_\_ Material \_\_\_\_\_ Well Thickness (Inches) \_\_\_\_\_ Outside Diameter (Inches) \_\_\_\_\_ Screen Type \_\_\_\_\_ Slot Size (Inches) \_\_\_\_\_  
0 25 10 Blank PVC Sch. 40 SDR 21 5  
25 105 10 Screen PVC Sch. 40 SDR 21 5 Milled Slots 0.320  
105 125 10 Blank PVC Sch. 40 SDR 21 5  
125 145 10 Screen PVC Sch. 40 SDR 21 5 Milled Slots 0.320

**Annular Material**  
Depth from Surface \_\_\_\_\_ Feet to \_\_\_\_\_ Feet  
Fill \_\_\_\_\_ Description \_\_\_\_\_  
0 20 Cement Sand Slurry  
20 150 Fill Cat silica

**Attachments**  
☐ Geologic Log  
☐ Well Construction Diagram  
☐ Geophysical Log(s)  
☐ Soil/Water Chemical Analyses  
☐ Other

**Certification Statement**  
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.  
Name David Enloe Enloe Well Drilling  
Person, Firm or Corporation  
P.O. Box 1698 Address Nipomo City CA 93444  
Signed \_\_\_\_\_ Date 10/9/2015 318877  
C-47 Licensed Water Well Contractor Date Signed C-57 License Number

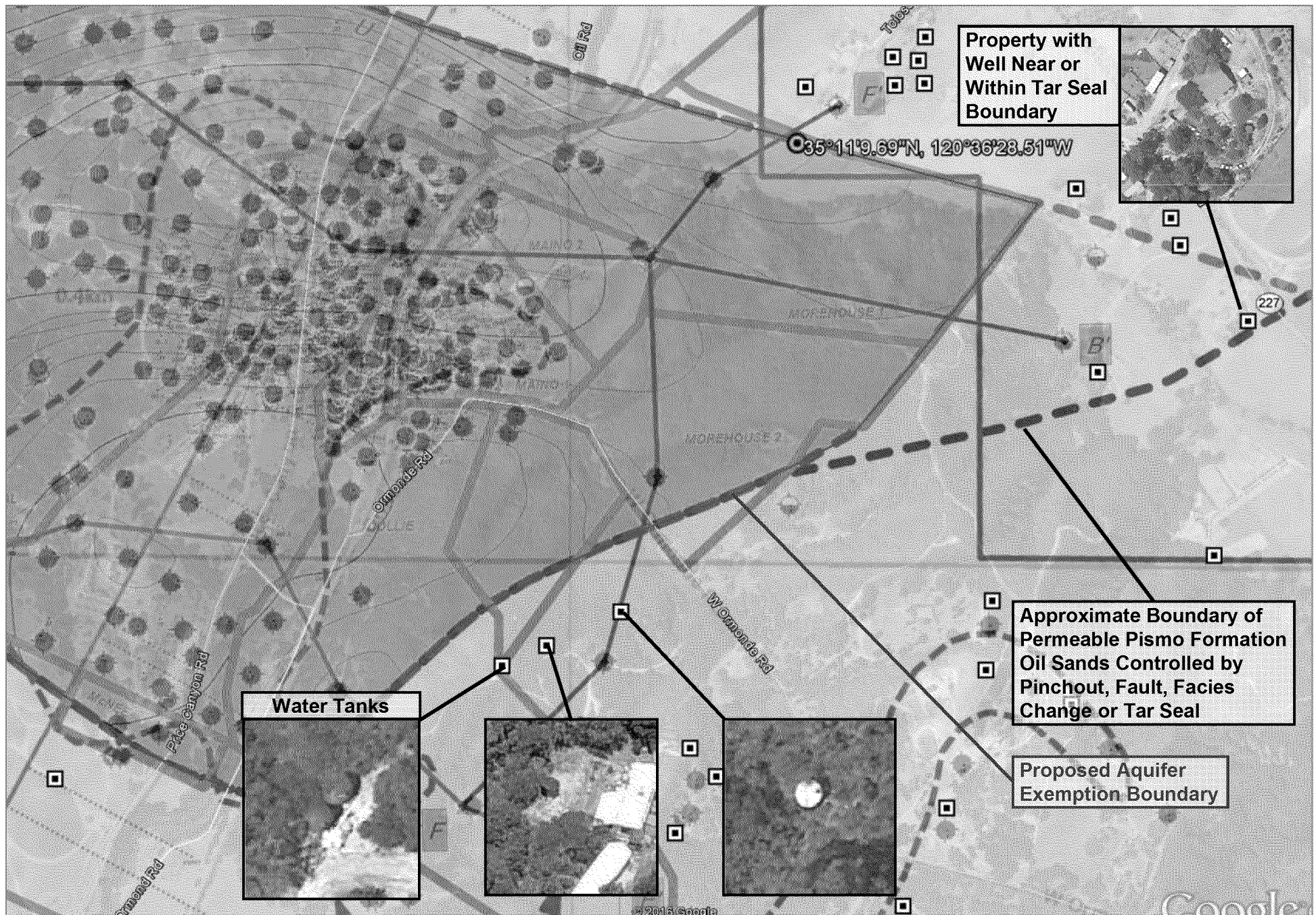
DWR 198 REV. 12/03



# **Attachment B**



## Attachment B – Map Showing Application Boundaries and Probable Well Locations

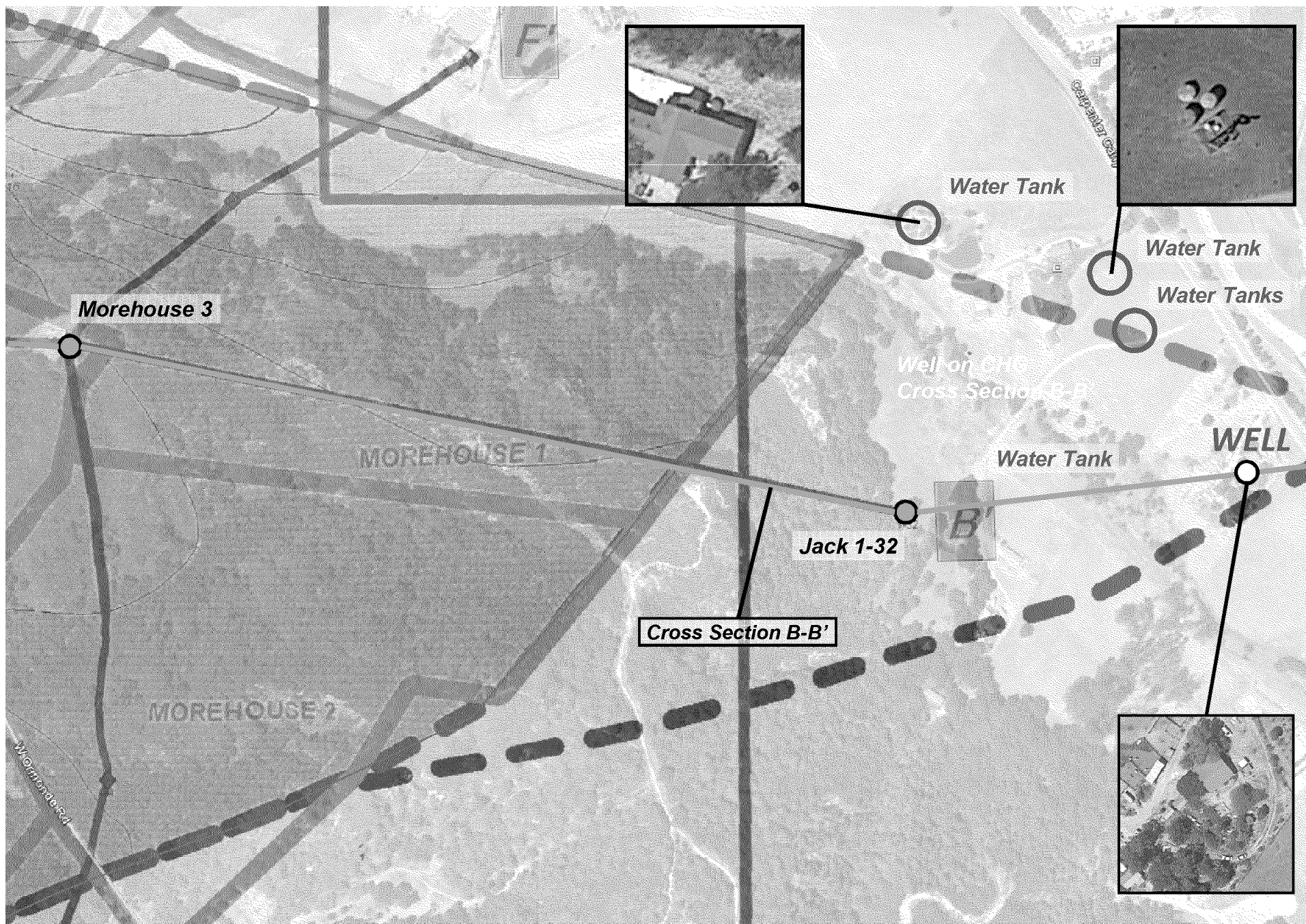


Boundaries are based on Figure 1-4 in the Application document, entitled "Arroyo Grande Oilfield San Luis Obispo County, California - Dollie Sands, Pismo Formation - Freeport-McMoRan Oil & Gas LLC". Oil well locations are based on map data obtained from the Division of Oil, Gas, and Geothermal Resources.



# **Attachment C**

# Attachment D - Aquifer Exemption Boundary and Probable or Confirmed Well Locations



Boundaries are based on Figure 1-4 in the Application document, entitled "Arroyo Grande Oilfield San Luis Obispo County, California - Dollie Sands, Pismo Formation - Freeport-McMoRan Oil & Gas LLC". Oil well locations are based on map data obtained from the Division of Oil, Gas, and Geothermal Resources.

# Attachment D - Amended Cross Section Showing Water Supply Well Within Boundary

